Canon T2000

03/15-254

Operating Manual Soundprojector
English version

Congratulations on your new Canon T2000 Sound Projector which will make the most of your Super-8 or Single-8 movies, be they silent or of the Ektasound type, with live sound recorded 'on location'. If you have movies taken with a silent Super-8 or Single-8 camera, the T2000 provides all the facilities you need to add sound on a magnetic stripe which can easily be put onto any 8 mm film after editing. If, on the other hand, you shoot live-sound films, the T2000 is not only the perfect complement to your sound camera, but will also help you optimize your live sound by adding a spoken commentary, music or special sound effects. This is particularly easy in the T2000, in which advanced electronics take over level control and even allow sound to be recorded on sound so that background music and a spoken commentary or special effects can be conveniently combined on a single track.

Although operation of your Canon T2000 is extremely simple, you should proceed methodically and with due care in order to obtain outstanding results and satisfaction. May we therefore recommend that you read these instructions very carefully from cover to cover and keep them close to the projector for easy and quick reference. Fold out the front and rear flaps with the nomenclature while reading the Manual.

1 Take-up spindle
2 Carrying handle
3 Framing knob
4 Focusing knob
5 Supply arm
6 Supply spindle
7 Film-threading slot
8 Zoom lens
9 Sound input
10 Master switch
11 Record button
12 Volume control
13 Rec/Trick control
14 Input selector
15 Front cover
16 Loop-former button
17 Vertical tilting screw

A few words about striped film

Sound projection is not predicated on the use of a sound camera. Any of your silent films can be provided with a magnetic stripe to add sound in the projector. You will be surprised at the sound quality you can obtain from your Canon T2000 and the difference this added sound can make.

Having silent film striped with a magnetic track is quite simple. Your photo dealer will gladly make the necessary arrangements. It is advisable to have a balancing stripe applied along the other edge of the film for uniform thickness and smooth winding. Remember, however, that your movie should be completely edited *before* striping.

If you are using sound cartridges in your movie camera, you do not have to worry about subsequent striping. In this case, your T2000 makes it very easy to fill in sound gaps on your films, which are quite natural because there is not always sufficient sound on location and polishing up your original sound track will give you much greater satisfaction.

The sound-on-sound recording feature of your T2000 even allows you to add further sound to the live-sound track to obtain a well-balanced mixture of original and 'studio' sound.

Before attempting to improve the live sound recorded in your movie camera, make absolutely sure that you are completely familiar with the few simple manipulations required for the purpose on your projector. Remember that live sound, once erased, cannot be brought back. A few trials on an old film whose sound track is no longer needed will greatly improve your results.

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Film editing

The sound in Super-8 sound cameras is recorded 18 frames ahead of the picture. This is a very important point to keep in mind during editing because cutting one of the two – picture or sound – always affects the other. Before adding further sound to your sound movies or putting sound on silent film, be sure to complete editing in all its phases, since additional editing after putting on the final sound would disrupt the latter.

Before starting with sound recording in the projector, carefully clean your edited film.

1. Always carry your projector by its handle (2). *Never* use the take-up spindle (1) or supply arm (5) for the purpose!

2. *Before* connecting the projector to the AC supply, be sure to check its voltage setting and compare it with the available line voltage. If necessary, remove the transparent plastic cover of voltage selector (18) at the rear of the projector and use a coin to set the proper voltage rating.
Note that improper voltage setting may cause damage to the projector if the latter is connected to the power supply.

3. Plug the power cord into receptacle (19) and connect it to a wall outlet.

4. Set the projector up at a suitable distance and height in front of the screen, using screws (24) and (17) for horizontal leveling and vertical tilting. Avoid excessive upward tilting of the projector, which will conically distort the screen image. Instead, try to center the projector as nearly as possible on the screen.

5. You can now turn master switch (10) 90° to the right to switch on the lamp so that the frame limits become visible on the screen. Turn knurled ring of zoom lens (8) to vary the size of the screen image as required. Then use focusing knob (4) to prefocus on the frame edges.

6. Swing out supply arm (5) and slip supply reel with film onto spindle (6) so that the film leader comes down at the front, the perforations facing you. The Canon T2000 will accept reels taking up to 600 ft or 180 m of film.
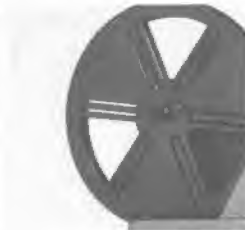
7. Attach the auto take-up reel supplied with the projector to spindle (1). Your Canon T2000 is now ready for operation.

These are intended exclusively as a general outline and for quick future reference. They cannot and will not replace the detailed explanations on the following pages.

1. Set speed selector (21) to the speed with which your film was exposed in the camera (18 or 24 fps).

2. Turn master switch (10) clockwise to its first stop and insert film leader about 4 inches or 10 cm into the film-threading slot below the white guide roller until it is gripped by the threading mechanism and automatically wound on the take-up reel.

3. Turn master switch (10) further clockwise to either silent projection or sound projection, as required.

4. Focus by turning knob (4) and turn knob (3), if necessary, to adjust the frame line.

5. Select playback volume in sound projection by turning the volume control (12).

6. When the film has reached its end, stop the projector by turning master switch (10) to zero and rewind either through film path or outside by first attaching the end of the film to the supply reel and turning master switch (10) fully counter-clockwise.
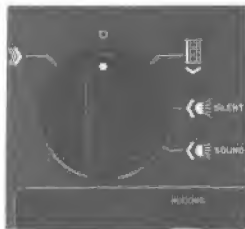
Master switch (10)
This is the main control of your T2000. Its normal position is with the white index dot on the knob facing up, opposite '0'. Even in this position, however, the amplifier is switched on as soon as the power cord is plugged into a wall outlet.

The symbols around the master switch are easy to understand. The arrows indicate motion directions. Clockwise, the first stop thus stands for film threading (downward motion of film across film gate). The next two positions fol-

lowing clockwise are silent projection and sound projection.

Counterclockwise rotation of the master switch will set your projector for fast rewind, either through the film path (should the film still be attached to the take-up reel) or outside, directly from reel to reel.

Framing knob (3)
When you start projecting, it may happen that the separating line betweeen frames becomes visible on the screen. This can easily be corrected by turning the framing knob. When the frame line has been set, it does not normally require readjustment during projection.
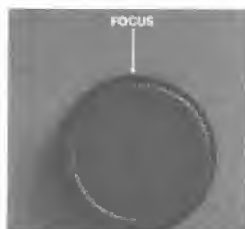
Focusing knob (4)
The extra-large focusing knob makes focusing particularly easy and smooth – a point of major importance in the projection of Super-8 or Single-8 film where even very slight axial shifting of the lens will result in a noticeable change in focus on the screen.

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Zooming ring of lens (8)
Your Canon T2000 has an f/1.5 high-speed zoom lens with focal lengths ranging from 16.5 to 30 mm. In other words, you can vary the size of the image projected onto the screen without actually shifting the projector. This gives you greater freedom in positioning the projector and allows easy adaptation to room conditions.

All you have to do to vary the size of the screen image is turn the knurled ring of the lens until the desired frame size has been obtained.

Loop-former button (16)
A poor splice or damaged film perforation may interfere with proper film transport through the projector. If this happens, you will hear a rattling noise which can be corrected and the projector restored to proper operating condition by pressing the loop-former button once or, if necessary, several times.

Speed selector (21)
This is a combined picture and sound control which determines the speed with which your film will be projected. Projection speed should always be the same as filming speed in the camera, unless the projector is used in the silent mode. In this case, a slight slow-motion effect can be obtained by projecting movies taken at 24 fps in the 18 fps setting.

Very critical users tend to shoot their sound movies at 24 fps, which gives slightly higher picture and sound quality but will in-

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crease film consumption by one third and also calls for sufficient light due to the slightly wider aperture required to make up for the faster running speed and shorter effective exposure per frame.

Please note that you cannot, of course, alternate between sound filming speeds of 18 and 24 fps because you can use only one of these speeds for projection (per reel) to avoid sound distortion. The decision which of the two speeds to use should therefore be made before you start filming.

The speed control (21) is a rocker switch. If it is actuated with the projector running, a rattling noise may be heard, and you may have to press the loop-former button (16).

Input (9)
This is a DIN 41524 jack for connection of the microphone supplied with the projector or of an auxiliary sound source, such as a tape recorder, cassette recorder or record player.
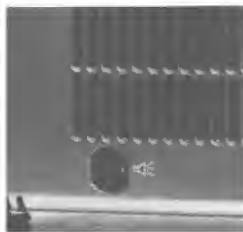
Output (22)
This is a DIN 41529 jack as is generally used for connecting loudspeakers to sound equipment. Make sure that the external speaker plugged into this output has a 4-ohm rating and set it up near the screen for optimum results. The built-in speaker (23) is automatically disconnected as an external speaker is plugged into output (22).

Alternatively, high-impedance headphones (≥ 600 ohms) may be connected

to this output. In this case also, the built-in speaker is automatically cut off.

Automatic level control (ALC)
Your Canon T2000 will automatically control the recording level, whatever the input. Operation thus is greatly simplified, and the number of trials required for obtaining good results reduced to a minimum.

Record button (11)
Recording is possible only with this button depressed. It locks in position and lights up red. It is automatically released as master switch (10) is turned to another position (except for silent to sound projection and vice versa).

The button can be depressed only with the master switch (10) set to silent or sound projection.

Note:
As a special safeguard, your Canon T2000 will not record any sound – and thus erase possibly un-retrievable original sound – *unless the* Rec/Trick *control (13) is switched on. For normal, full-level recording, the* Rec/Trick *control (13) should be turned all the way to its right-hand stop.* In other words, should you inadvertently press the Record button (11), nothing is lost yet, and you should make it a rule to keep the Rec/Trick button on *off* unless you actually wish to put on sound.

Volume control (12)
This serves to control volume during playback via the built-in speaker or an external speaker connected to output (22). The reference points provided around the knob serve for orientation and facilitate resetting to any given position. The knob is inoperative during sound recording.

Rec/Trick control (13)
This is a very important control of your Canon T2000 because it allows sound-on-sound recording and thus puts accomplished multi-source sound tracks within easy reach even of inexperienced sound-movie fans.

First and foremost, however, remember that the Rec/Trick control has two functions:

1. It is indispensable for *recording*, even if no special effects are desired. In this case, the control should be turned against its right-hand stop (*maximum* symbol of scale). Only in this position will the full input volume reach the sound track.

To prevent any inadvertent erasure of existing sound, always keep this control in its *off* position when you do not wish to make a recording.

2. The trick function of this control takes over for special effects. Clockwise rotation of the knob will gradually increase the recording level, thus allowing a certain measure of fading. What's more, as you turn the knob clockwise, you will not only increase the volume of new sound on the track, but at the same time decrease the volume of previous sound that may already be on the same track. In other words, new recording is here coupled with proportionate partial erasure which, in the maximum setting at the right-hand stop, becomes full erasure and thus complete re-recording.

The partial erasure feature means that if you wish to obtain a straightforward fade-in on a track which already carries a recording, you will first have to erase a certain length of that track fully (with the trick control turned all the way to the right but no sound source connected to input (9)), then rewind the film, start the projector in the recording mode and turn the trick control clockwise until you reach its right-hand stop.

If, on the other hand, you wish to fade a new recording into an existing one on the same track, all you have to do is start the projector in the recording mode and slowly

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turn the trick control to maximum position (right-hand stop).

Fading out is just as easy with the trick control as fading in. Simply turn the control slowly back to its *off* position, and the sound will either fade away on a clean track, or the original sound will be simultaneously brought back to full level as the added sound recedes.

Input selector (14)
This switch has two functions:
1. Shifted to the left (micro), it will cut off the built-in speaker (23) to avoid feedback (screeching noise) during microphone recording.
2. It adapts the automatic level control to different input sources (microphone in its left-hand setting, auxiliary source such as a tape recorder in its right-hand setting marked AUX).

Take care to shift this switch to the proper position after connecting your source to input (9).

You are now familiar with the different controls and functions of your projector.
To project your movies, proceed as follows:

1. All your films should have a sufficient length of leader at either end. Before threading, check the leader on the supply reel and make sure that it is neither bent nor damaged. If necessary, cut the leader straight at its front end.

2. Shift speed selector (21) at the top of the projector to the speed used in your camera for shooting.

3. Insert the film leader into the threading slot (7) below the white guide roller and turn master switch (10) to its threading position. The leader should be pushed into the slot some 4 inches or 10 cm deep, until it is positively gripped by the drive mechanism and automatically threaded through the film path. Keep the master switch on *threading* until the leader emerges in the take-up reel and is tightly wound around it. The entire

threading operation from reel to reel is automatic, except for insertion of the leader.

4. Turn master switch further to silent or sound projection. Your film image will appear on the screen.

5. Turn knob (4) for fine focusing and correct frame line by turning knob (3), if necessary.

6. Adjust the desired play-back volume by turning knob (12). Make sure that input selector (14) is in Aux position if playback via the built-in loud-speaker (23) is desired.

7. Sit back, relax and enjoy your home movie production. Should the projector make a rattling noise, protesting against some torn perforations or poor splice, press the loop-former button (16) once or twice.

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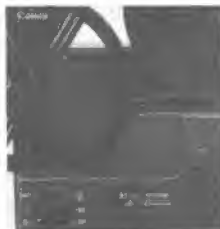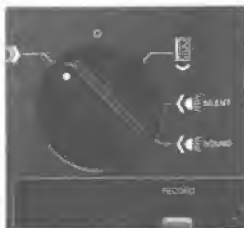
8. When the end of your film has been reached, keep the projector running until all the film has been wound on the take-up reel. Then guide the trailing end of the film past the small roller between the two reels and onto the empty supply reel at the front. Shift speed selector (21) to 24 fps and turn the master switch fully counterclockwise for fast rewinding. You might also leave the speed selector on 18 fps. In this case, however, rewinding will take slightly longer.

Alternatively, should the film not yet have come off the supply reel, you can also rewind it through the film path. Rewinding speed is the same, and since all guides are fully released, there is no undue strain on the film.

Your Canon T2000 is not only designed simply to project your sound movies but is, in fact, a kind of 'magnetic tape recorder' at the same time. In other words, you can put new or additional sound on your film as well.

Recording procedure
May we recommend that you proceed methodically, using a test film at first, whose sound track can be erased and filled with new recordings, until the recording operation as such is completely familiar to you so that you will have no difficulty starting and stopping your sound exactly where the corresponding frame appears or disappears on the screen.

For sound recording, proceed as follows:
1. Connect sound source to input (9).

2. Shift input selector (14) to the proper setting for your source (left for microphone recording, right for auxiliary source, such as tape recorder or record player).

3. Shift selector (21) to proper speed and switch projector to sound recording.

4. When you reach the point on the film at which recording should start, press record button (11) and, at the same time, switch on the Rec/Trick control (13) to fade in your sound. Alternatively, should you wish to start recording at full level without any fade-in or should the track contain some previous recording that has to be erased, turn the Rec/Trick control against its right-hand stop before starting the projector and press record button (11) to start recording.

5. To stop recording, either use Rec/Trick control (13) to fade out gradually by turning it fully counter-clockwise to its *off* position or stop the projector by resetting its master switch to '0'. In the latter case, be sure to reset the Rec/Trick control afterwards, unless you wish to continue with another recording at full level.

As a precaution, always keep the Rec/Trick control at its *off* position to prevent erroneous erasure.

Important note:
Remember that any recording will erase part or all of the previous recording. Consequently, be extremely careful with live sound recorded in your sound camera. Whatever you add to a live-sound track irretrievably alters or even erases your original sound.

During recording, you can check the sound put on the sound track through

the built-in speaker (input selector (14) in the Aux position). This does not apply to microphone recording, however, in which case the input selector (14) should be in its left-hand Micro position, in which the built-in speaker is cut off to avoid feedback.

Using the microphone
The microphone supplied with your projector is of the omnidirectional type. In other words, it will pick up most of the sound around it. Care should therefore be taken not to hold the microphone too close to the projector, or running noise may be picked up.

Hold the microphone at a constant distance of about 4 inches or 10 cm from your mouth and speak at a constant level. Wind the microphone cord once around your hand in a loop to prevent any pulling

on the cord during recording. Remember that even slight tapping against the microphone, pulling on its cord or rubbing will be recorded as disturbing noise. Also keep the input selector (14) in its left-hand position (Micro) to avoid feedback.

Recording sound on sound
This technique allows the mixing of several sound sources on one and the same sound track. Technically, this means that you have to go over the same sound track again without erasing it fully. This is made possible by variable erasure in the T2000, which is controlled by the Rec/Trick control (13). Depending on the position of this control, the original recording on the track will be erased only partly and the new recording superimposed in the corresponding proportion. As a result, it is fairly easy to combine background music, for example, with a spoken commentary and, possibly, special sound effects.

While the recording procedure is as usual, the Rec/Trick control must here be kept on *off* until the additional sound is to be faded in. Then slowly turn the trick control to a position which very likely will be somewhere in the medium range of the scale. The exact position suitable for your type of source and background and the effect desired can easily be found by some experimentation.

If several sources are to be combined on the same track by this technique, the following order is generally found most satisfactory:

First recording: music or background noise, possibly live sound.
Second recording: speech.
Third recording: special effects.

The following accessories
are supplied with your
Canon T2000:

Auto take-up reel.
Power cord.
Microphone.
Aux cable.
Brush for cleaning film
path.

In addition, an optional
DV-2 Daylight Viewer is
available that can be at-
tached to the front of the
projector and has a small
viewing screen facing the
operator at the controls. It
is designed as an aid in
sound editing and
recording work.

Your Canon T2000 Sound Projector will give you many hours of screening pleasure if it is handled with care, following the instructions in this Manual. Never force anything and beware of tampering with the machine. Should you have difficulty in obtaining a desired function, consult your dealer or the Canon Service directly. If necessary, turn your projector over to an authorized Canon Service Center for servicing or repairs.

After projection, reset master switch (10) to '0' before putting the projector away for storage in a dry, cool place where it is protected from dust. Also take care to store your striped films properly. Remember that striped films are equivalent to magnetic tape and should not be kept near strong magnetic fields, such as loudspeakers.

Since emulsion particles are bound to build up along the film path, this should be cleaned regularly. Also clean the front and rear elements of the zoom lens, dusting them off with a hair brush and very carefully wiping them with an absolutely clean, fluffless linen cloth to remove stubborn smudges.

Important note:
Be sure to pull the power cord before attempting any of the maintenance operations described below!

Removing the front cover (15)
Removal of the front cover will give access to the lamp and the entire film path. To remove the cover, simply grasp it by its lower sides and pull it forward. To replace the cover, slip it over the various knobs and use two hands on the upper right-hand half to push it until it locks in place.
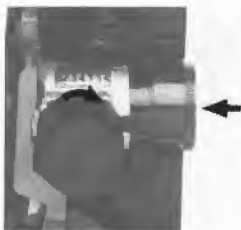
Removing the lens (8)
1. Take off front cover.
2. Use your left hand to turn focusing knob (4) clockwise as far as it will go.
3. Lightly push in on zoom lens (8) and turn focusing knob further clockwise.
4. Pull lens straight out. To replace the lens, make sure that the focusing knob is at its right-hand stop. Then insert the lens with its guide pin engaging the corresponding slot in the mount, push it in and turn the focusing knob counterclockwise. Replace the cover.

Changing the lamp
1. Remove front cover.
2. **Caution:** Wait until the lamp has cooled down sufficiently to avoid burns!
3. Turn framing knob (3) fully counterclockwise.
4. Press down on lampholder spring (25) and swing it out to the left.
5. Withdraw lamp socket, grasp dichroic reflector at its front and remove lamp with reflector by pulling forward.
6. Plug a new 12 v, 100 w tungsten-halogen lamp with dichroic reflector (supplied by Osram, Philips, Atlas and Sylvania) into the lamp socket.

Caution: Never touch inside of reflector or quartz bulb of lamp with your bare fingers! Fingerprints would burn into the glass and impair illumination.
7. Hold lamp socket with its two leads facing forward and fit lamp reflector into projections of mounting plate.
8. Hold lamp with socket in this position and swing in lampholder spring (25), fitting it under the projection at the forward end of the mounting plate.

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9. Check whether the lamp is firmly seated on the mounting plate. The lamp is prefocused and does not require any adjustment.
10. Replace front cover.

Cleaning the film path
1. Remove front cover (15).
2. Turn focusing knob (4) fully clockwise.

3. Turn master switch (10) fully counterclockwise (rewind position). This will open all film-path guides.

4. Grasp lower end of pressure-plate assembly (26) with your left thumb and index finger, depress the spring bracket with your index finger and pull the assembly straight forward, taking care not tilt it to the left. The pressure plate and film aperture can now be cleaned.
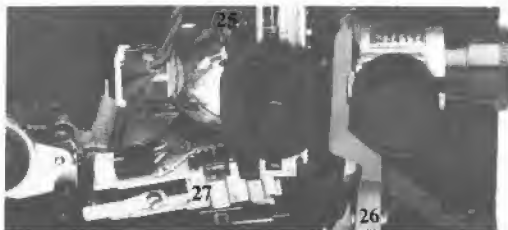
5. Use the brush supplied with your projector and clean the film gate, the film path leading past the sound heads (27) and up to the film exit at the rear.
6. To clean sound heads (27), use a cotton swab soaked in alcohol or a special sound-head spray. *Never* touch magnetic heads with a metallic object, such as a screwdriver!
Replace parts in the reverse order.

Should you ever wish to remove a film in mid-reel, proceed in the same manner. With master switch (10) on rewind and the pressure plate removed, you can carefully extract the film from the film path. To extract the film from under one of the last rollers on the left, it is necessary to pull off the knob of master switch (10). When replacing the knob, be careful to push it on in the proper position: white index dot on left (= rewind position).

Canon T2000 Sound Projector for Super-8 and Single-8 sound or silent film.

Lens: 16.5–30 mm f/1.5 zoom lens.
Projection lamp: 12 v, 100 w tungsten-halogen lamp with dichroic reflector.
Film transport: by transformer motor.
Running speed: 18 fps and 24 fps (silent and sound projection).
Film threading: automatic from reel to reel.
Master switch: controlling film threading, silent projection, sound projection

and fast rewind.
Rewind: in-path or exterior.
Loop former: automatic. with manual override.
Reel capacity: 600 ft or 180 m.
Power source:
50 Hz, 110, 120, 220, 230, 240 volts.
60 Hz, 100, 120, 200, 220 volts.
(Electrical equipment varies to suit local conditions.)
Voltage selector provided.
Audio input: DIN 41524 jack for connection of microphone or auxiliary source (tape recorder, cassette recorder, record

player, etc.).
Output: one DIN 41529 jack for external 4-ohm speaker or high-impedance headphones.
Built-in loudspeaker: 10 watts at 4 ohms.
Recording options: straight forward and sound-on-sound recording. Fading by means of trick control. Automatic level control (ALC).
Amplifier:
Output: 6 WRMS/7 watts music power.
Frequency response at 18 fps: 80–8,000 Hz.
at 24 fps: 80–10,000 Hz.
**Monitoring:** via built-in loudspeaker or high-impe-

dance headphones connected to external-speaker output. Built-in speaker can be switched off for microphone recording. Speaker is switched off automatically if external-speaker output is used.
Accessories: power cord (2 m), 600ft/180 m auto take-up reel, microphone, aux cable and brush.
Optional accessory: DV-2 Daylight Viewer.
Dimensions (mm):
290 (L) × 240 (H) × 190 (W).
Weight: 6.1 kg.

Subject to change without notice.
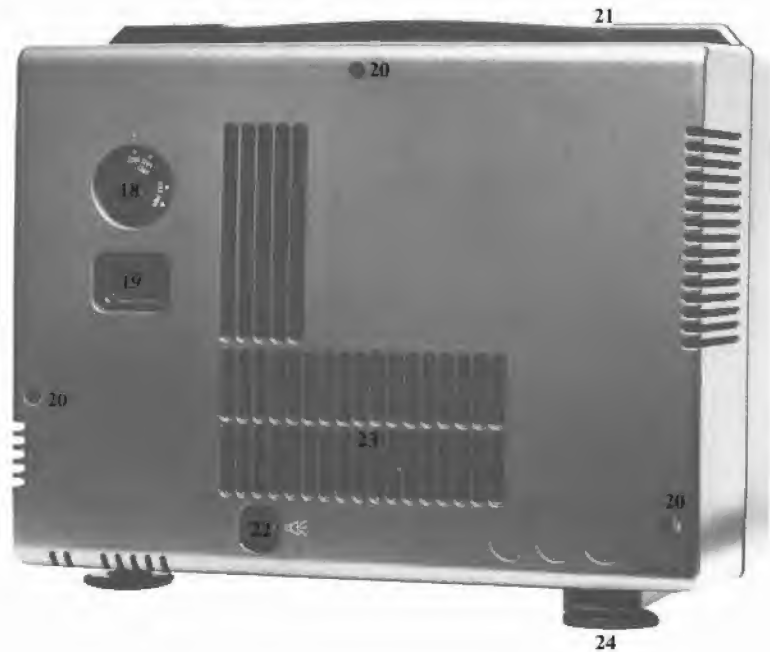
18 Voltage selector
19 AC line input
20 Rear-cover mounting
   screws
21 Speed selector
22 External-speaker output
23 Built-in loudspeaker
24 Horizontal leveling screw